

# RAPID RESOLUTION OF INFANTILE ACUTE SUBDURAL HEMATOMA: A CASE REPORT

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Subdural hematomas in infants are uncommon but usually result from non-accidental trauma or from trauma associated with motor vehicle accidents. This report describes the case of an infant with a traumatic acute subdural hematoma that resolved within 65 hours. A 23-month-old boy fell from a height of approximately 10 m. Brain computed tomography disclosed a left subdural hematoma with midline shift. The associated clots resolved spontaneously within 65 hours of the injury. Although they may mimic more clinically significant subdural hematomas, such collections of clots are likely to be located at least partly within the subarachnoid space. Their recognition may influence decisions regarding both surgical evacuation and the likelihood of non-accidental injury. Clinical and radiographic features distinguishing these “disappearing subdural hematomas” from more typical subdural hematomas are discussed.

**Key Words:** acute subdural hematoma, infant, head injury  
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Subdural hematomas in infants are uncommon but usually occur in association with non-accidental injury [1,2]. Acute subdural hematomas appear to result either from large angular acceleration-deceleration forces that result in rupture of bridging veins over the cerebral surface or from impact, with distortion and failure of deep draining veins [3–6]. An acute subdural hematoma is a severe insult with a mortality rate of 60–80% [7,8]. Except for inoperable patients with irreversible brain stem injuries and patients in generally poor health, most patients with hematomas undergo surgery to remove the hematoma or external decompression. Therefore, only a few cases of spontaneous resolution of acute subdural hematoma have been reported. In this report, an infant exhibiting rapid spontaneous resolution of an acute subdural hematoma is described, and the mechanism underpinning rapid resolution of the hematoma is discussed.

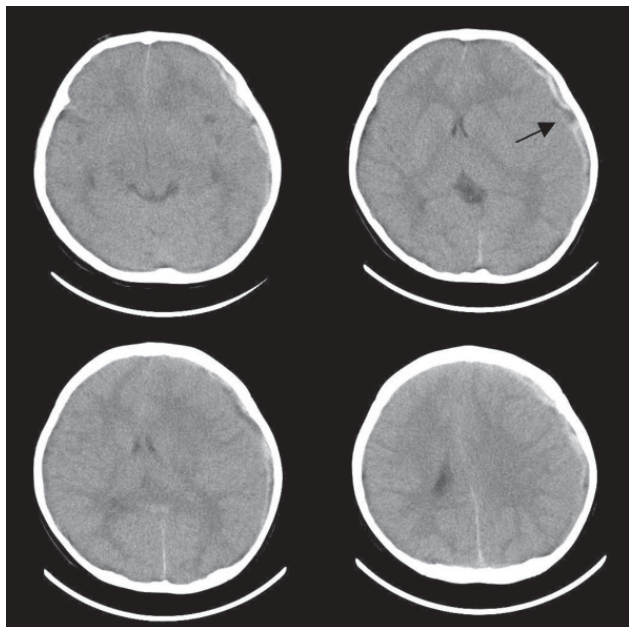
## CASE PRESENTATION

A 23-month-old boy fell from a fourth floor balcony (a height of approximately 10 m). At the time of the fall, neither loss of consciousness nor convulsions were observed by his family. Upon immediate admission to our emergency department, the boy was found to be lethargic with a Glasgow Coma Scale (GCS) score of E4V5M5. Physical examination revealed hematomas over the scalp and left knee. Neurologic examination disclosed impaired movement of the left leg but no other neurologic defect. The infant's pupils were equal in size and reactive to light. Computed tomography (CT) disclosed a subdural hematoma with a thickness of approximately 0.7 cm in the left fronto-temporoparietal area and with midline shift. There was a thin low-density area in the lateral portion of the hematoma, consistent with the presence of cerebrospinal fluid (CSF) in the subdural space (Figure 1). Other studies were performed, including abdominal ultrasound and plain film X-ray of the thoracic and lumbar spine and of the left knee (anteroposterior view). A left femoral supracondylar fracture was suspected. After administration of 100 mL glycerol by

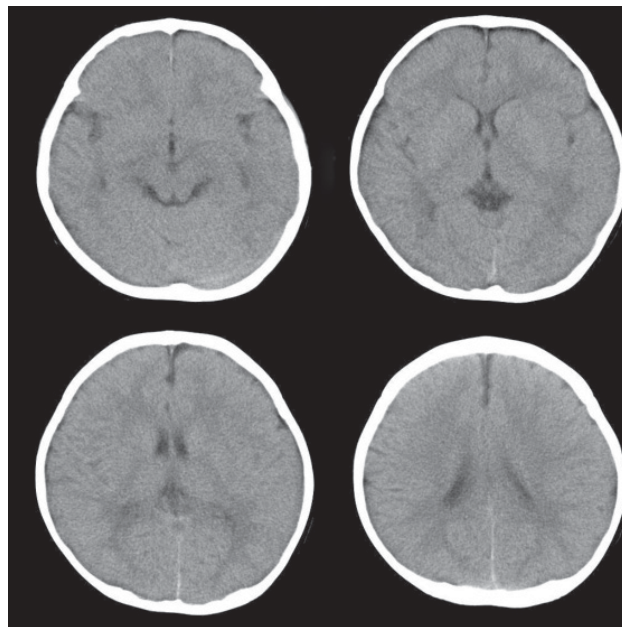
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**Figure 1.** Computed tomography scan obtained on admission shows a mixed-density subdural hematoma and brain edema. The low attenuation (arrow) is consistent with involvement of cerebrospinal fluid.



**Figure 2.** Computed tomography scan performed 65 hours after the trauma reveals diminution of the hematoma.

intravenous infusion, the patient's level of consciousness increased to E4V5M6. Because of this improvement, surgery was withheld and the patient was transferred to the intensive care unit for close monitoring. Mannitol (4 g) was administered by intravenous infusion at 8-hour intervals in combination with maintenance fluids and electrolytes. Although he vomited frequently for 48 hours after admission, the patient showed no deterioration in GCS score. Subsequent CT performed approximately 65 hours after the trauma disclosed spontaneous resolution of the hematoma (Figure 2). He was given prokinetic medication, whereupon his gastrointestinal symptoms improved. After closed reduction of the left femoral supracondylar fracture, he was discharged in good physical condition.

## DISCUSSION

When acute subdural hematoma is diagnosed in an infant, the neurosurgeon in charge must decide quickly whether or not to surgically evacuate the clot. This decision is made on the basis of the clinical status of the patient and the radiologic findings (hematoma volume, mass effect, and appearance of basal cisterns and brain parenchyma). Delay in the treatment of infantile acute subdural hematoma or failure to diagnose this condition may result in severe morbidity or

even fatality [9]. Craniotomy is, therefore, required to treat "fulminant" acute subdural hematoma in infancy [10].

The infant described in this report appeared less impaired than usual in children with typical acute subdural hematomas. His level of consciousness was preserved, and no typical motor weakness or papillary asymmetry was noted. Brain CT revealed bleeding over the left hemisphere with a slight mass effect. In view of these clinical and radiographic findings, non-surgical procedures were chosen to manage the hemorrhage. As a result of this choice, the hemorrhage resolved in a rapid and spontaneous fashion and a favorable clinical outcome was obtained.

Other cases of acute subdural hematomas that diminished or disappeared spontaneously have been reported [9,11–15], and mechanisms whereby resolution of these hematomas may occur were proposed in some of these reports. Nagao et al described a pediatric hematoma that resolved rapidly and proposed that the hematoma was exposed, diluted, and washed out due to participation of the CSF secondary to tearing of the arachnoid membrane [12]. Niikawa et al described three cases in which the CSF diluted an acute subdural hematoma and hypothesized that the hematoma was resolved via washout or redistribution [11]. Matsuyama et al speculated that spontaneous resolution of an acute subdural hematoma depends on both dilution through CSF participation and

redistribution of the blood, but that acute cerebral swelling is not a necessary condition [15]. Additionally, these authors proposed that optimal elasticity of the brain and outflow of the CSF are required for resolution.

A case of pure infantile acute subdural hematoma with rapid resolution, as presented here, has not been described previously. The infantile acute subdural hematoma described in this report resolved within 65 hours. The characteristic features of this case, as revealed by CT, were participation of the CSF at the hematoma, the presence of acute cerebral swelling and edema, the absence of prominent cerebral contusion, and a normal basal cistern with no herniation. Therefore, the events likely to be responsible for resolution of this hematoma are tearing of the arachnoid membrane, CSF wash-out and dilution of the hematoma, pressure-induced blood redistribution, and recovery of an elastic brain to its original status.

Although evacuation via craniotomy remains the treatment of choice for acute subdural hematoma in infants with marked brain shift, conservative management with careful monitoring is justified in selected patients who show neurologic and radiologic improvement, as evidenced by the present case. When considering the management of infantile acute subdural hematoma, clinicians should keep in mind the fact that there are patients, such as this one, for whom an acute subdural hematoma is "benign".

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# 嬰兒急性硬腦膜下出血之快速吸收 — 病例報告

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嬰兒急性硬腦膜下出血極為少見，大部份發生於非意外性之傷害或與車禍有關。在此我們報告一例外傷性急性硬腦膜下出血在受傷 65 個小時後快速吸收之病例。這是一位 1 歲 11 個月大的男嬰因不小心從 10 公尺高處摔下來。腦部電腦斷層檢查發現為左側硬腦膜下出血併腦中線轉移。這血腫在受傷 65 個小時後的第二次腦部電腦斷層檢查發現已完全自動吸收。一般認為這血腫有一部份是在腦蜘蛛膜下腔內，但在影像上看卻像是在硬腦膜下之血腫。當發現嬰兒急性硬腦膜下出血時，第一個考慮是嬰兒是否需接受開顱及血腫清除手術。第二個考慮是該嬰兒是否為非意外傷朗所引起如「受虐兒」。本篇報告主要是討論會自動消失之硬腦膜下出血與典型硬腦膜下出血在臨床上與影像學上之異同。

**關鍵詞：**急性硬腦膜下出血，嬰兒，頭部外傷  
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